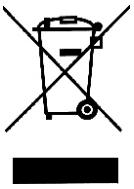
Vision
ENGINEERING

Mantis

Service Manual

Mantis Compact & Elite

Health & Safety



Vision Engineering and its products conform to the requirements of the EC Directives on Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS).

SYSTEM DIAGRAMS

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Mantis Elite 2

OBJECTIVE SPECIFICATIONS

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Mantis Elite 3

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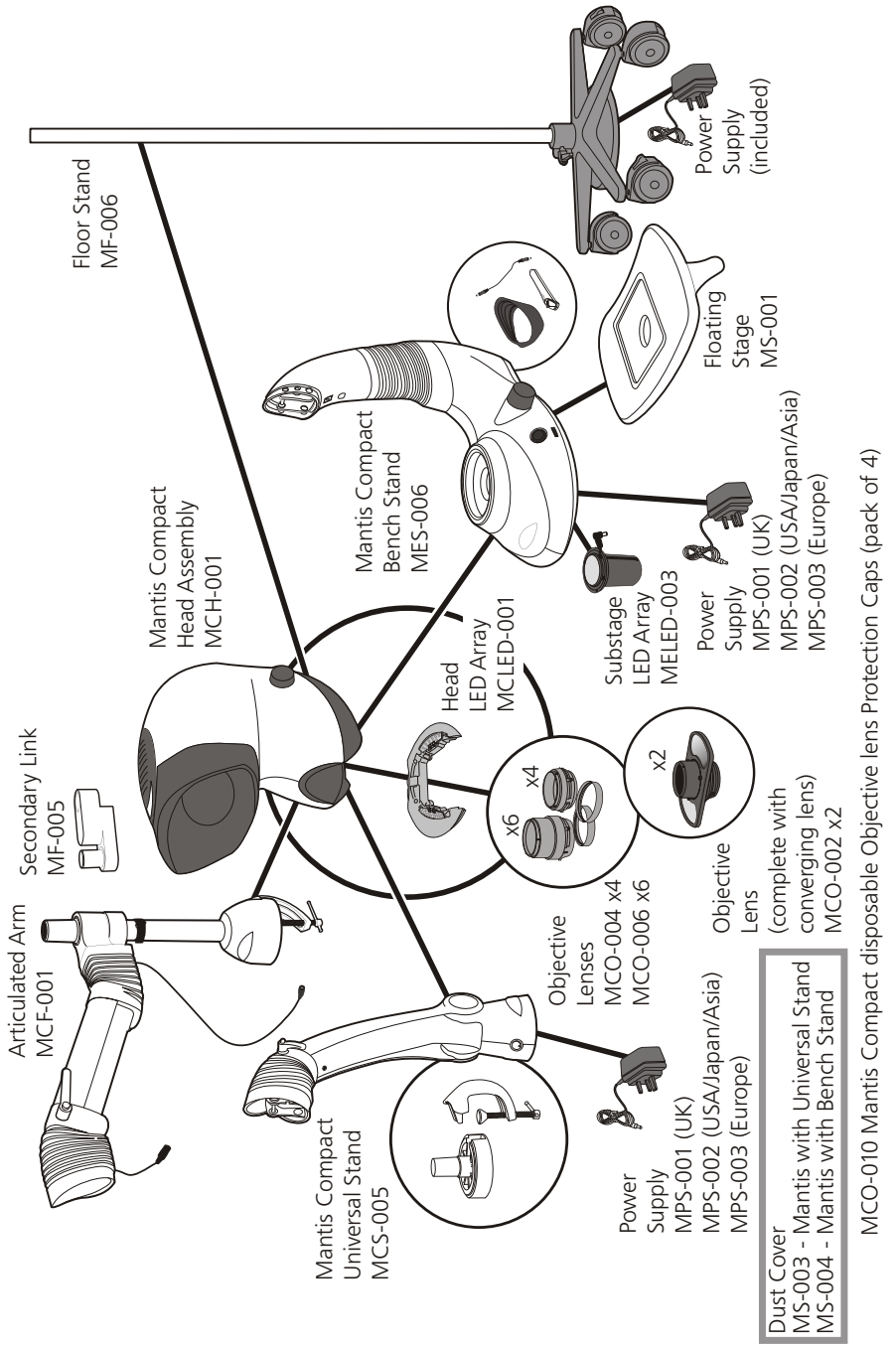
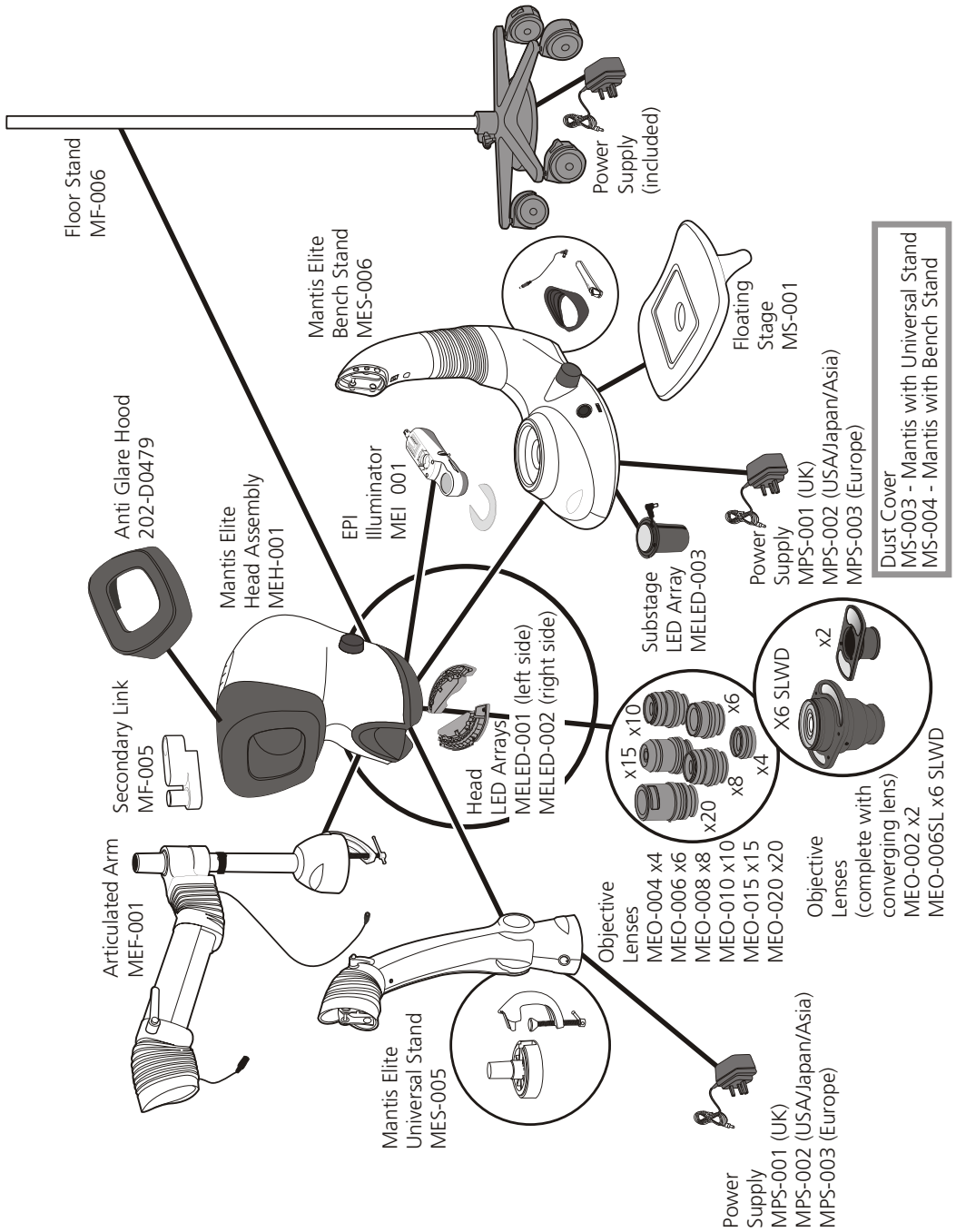
Mantis Compact



Mantis Elite



Mantis Compact

Objective Lenses	Part Number	Working Distance	Field of View
X2	MCO-002	167mm / 6.57"	45.0mm / 1.77"
X4	MCO-004	96mm / 3.78"	27.5mm / 1.08"
X6	MCO-006	73mm / 2.87"	19.2mm / 0.76"

Mantis Elite

Objective Lenses	Part Number	Working Distance	Field of View
X2	MEO-002	160mm / 6.29"	57.0mm / 2.24"
X4	MEO-004	96mm / 3.78"	34.0mm / 1.34"
X6	MEO-006	68mm / 2.68"	23.0mm / 0.91"
X8	MEO-008	59mm / 2.32"	17.0mm / 0.67"
X10	MEO-010	54mm / 2.13"	13.5mm / 0.53"
X15	MEO-015	40mm / 1.57"	8.8mm / 0.35"
X20	MEO-020	29mm / 1.14"	6.5mm / 0.25"
X6 SLWD	MEO-006SL	112mm / 4.41"	20.0mm / 0.79"

Parts table

Part Name	Part Number	Picture
Mantis Floating Stage (Elite and Compact)	MS-001	
Mantis Compact X4, X6 Disposable Lens Protections Caps (4-pack)	MCO-010	
Mantis Elite Disposable Lens Protection Caps for X4, X8, X10 (4-pack)	MEO-025	
Mantis Elite Disposable Lens Protect Caps for X6 (4-pack)	MEO-026	
Dessicant, 10-pack (Blue good; Pink replace)	M006	

Mantis Compact

Replacing the desiccant (see the diagram below):

- Disconnect the power cord from the back of the head.
- Remove the screw securing the desiccant cover and remove the cover ❶.
- Replace the desiccant and reinstall the cover.
- Reconnect the power cord at the back of the head.

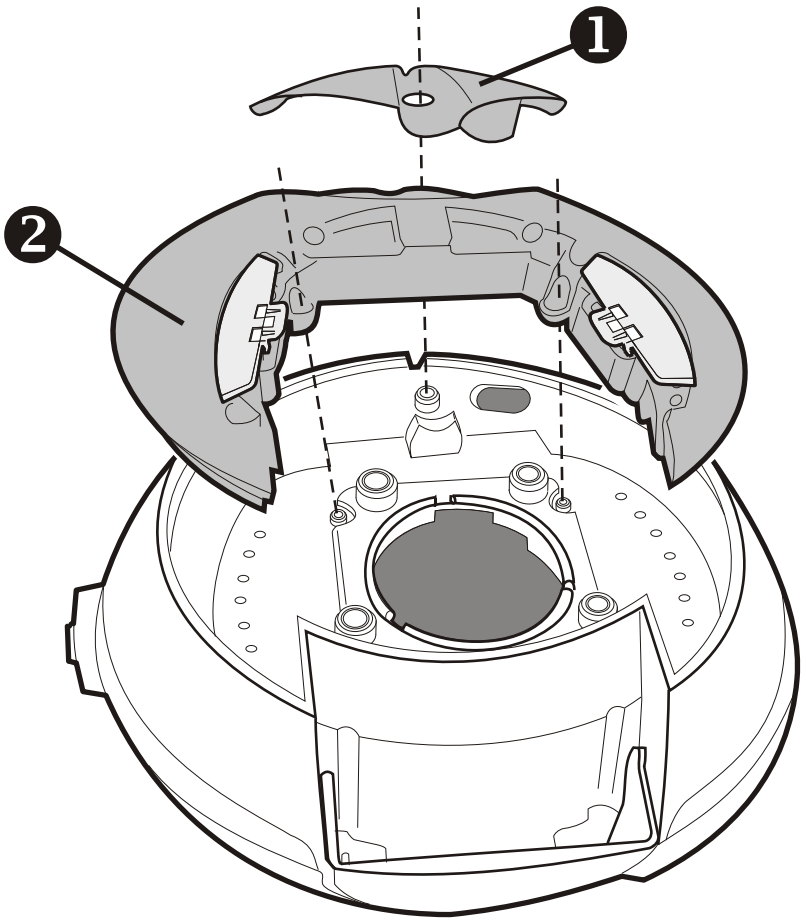
Note: If the desiccant is pink it needs to be replaced. Useable desiccant is blue.

Replacing the LED array (see the diagram below):

- Disconnect the power cord from the back of the head.
- Remove the desiccant cover ❶ (see **Replacing the desiccant** above).
- Remove the two screws that secure the array to remove the array ❷ complete with the filters.
- Install the new array using the reverse of this procedure.

Note: Do not over tighten.

- Reconnect the power cord at the back of the head.



Mantis Elite

Replacing the desiccant (see the diagram below):

- Disconnect the power cord from the back of the head.
- Remove the grommet ❶ covering the desiccant and remove the desiccant.
- Install fresh desiccant and replace the grommet.
- Reconnect the power cord at the back of the head.

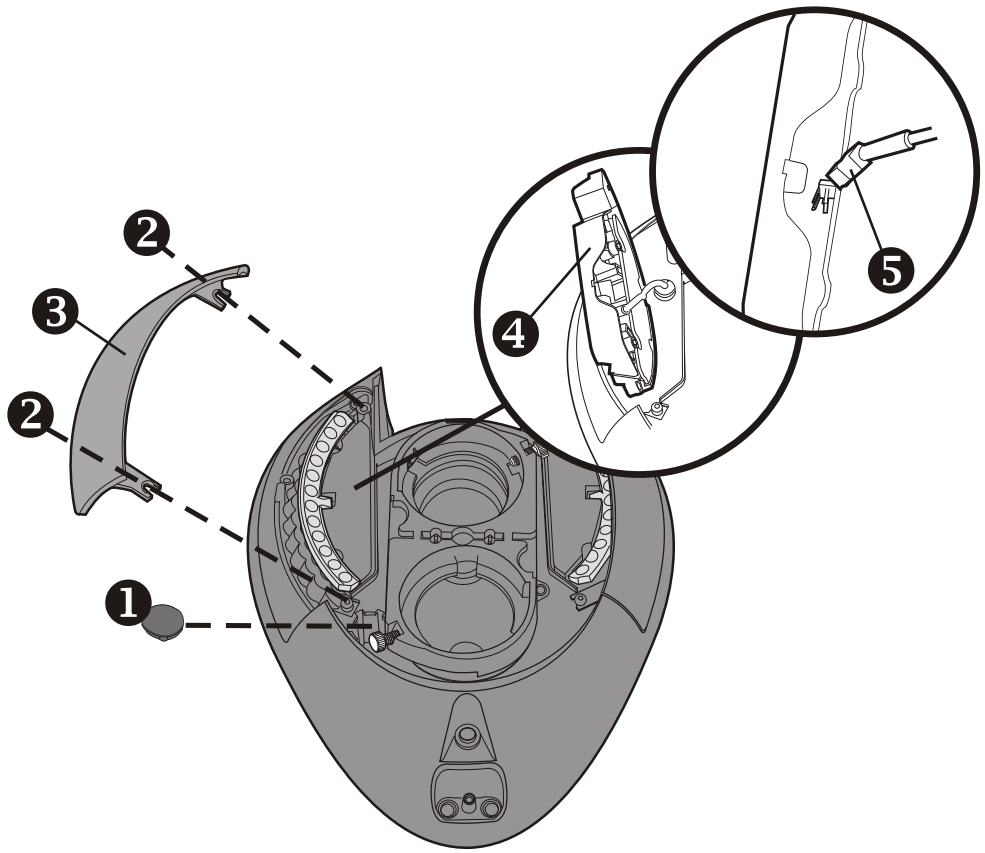
Note: ***If the desiccant is pink it needs to be replaced. Useable desiccant is blue.***

Replacing the LED array (see the diagram below):

- Disconnect the power cord from the back of the head.
- Loosen the two screws ❷ that hold the filter/array cover ❸ and remove the cover.
- Lift out the LED array ❹ complete with filter and disconnect the array connector ❺.
- Install the new array using the reverse of this procedure.

Notes: ***Do not over tighten screws.***

The Mantis Elite uses 2 LED arrays; one for the right and one for the left. There are also 2 different versions of these arrays; serial number up to and including MEH-10756 use array version "none". From MEH-10757 and on, use version 2 of the array.



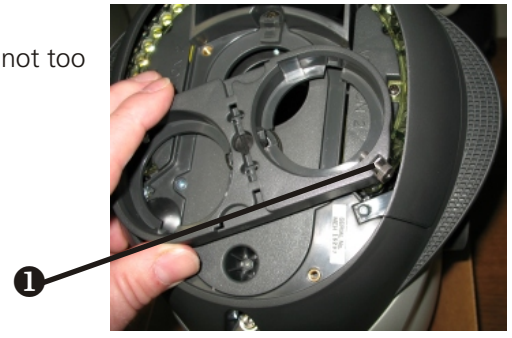
Mantis Elite turret replacement

Required Tools: #1 Philips/crosshead screwdriver

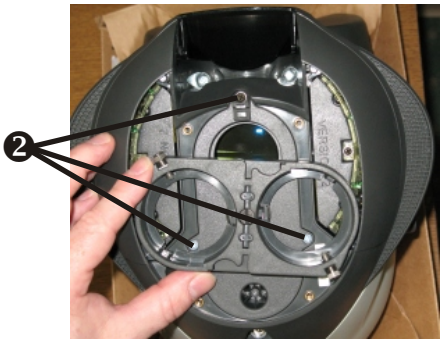
- Remove any objective lenses that may be installed in the turret.

- Uninstall the Mantis Head from the stand.

- Rest the viewing head upside down (objective turret facing up). Be sure to secure the head so that it does not roll off of the work bench (a small, empty cardboard box works well).



- Ensure the objective lens securing screws ❶ are fully screwed in (but not too tightly).



- Rotate the turret so that you can see all three of the mounting screws ❷.

- Remove all three screws on the inside of the turret.

Note: ***the front screw has a washer.***

- Remove the old turret and replace with the new turret.

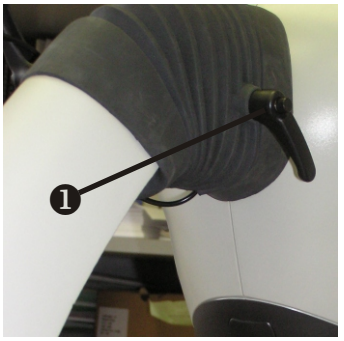
- Replace all three screws.

Note: ***do not over tighten.***

- Reinstall the head to the stand.

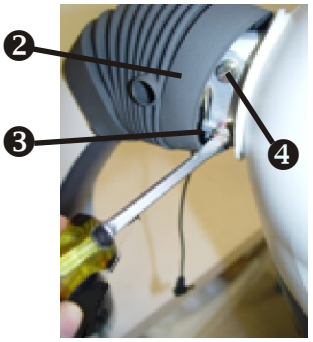
- Reinstall the objective lenses and verify the new turret rotates smoothly.

Replacing Mantis Elite pivot/tilt assembly

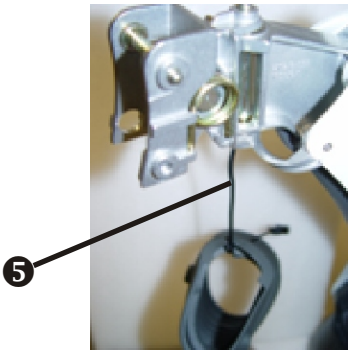


Note: ***Read all the following instructions before commencing work.***

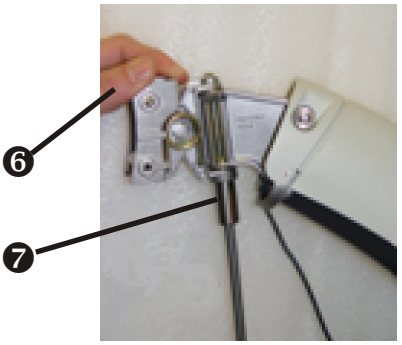
- Isolate the Mantis from mains power.
- Unscrew the left-hand side handle ❶ and discard.



- Release the rubber gaiter ❷ from the groove in the head unit and peel back to expose the head mounting screws.
- Using a flat-bladed screwdriver, remove the lower head mounting screw ❸ completely.
- Whilst holding the head, back off the upper head mounting screw ❹ by exactly 2 complete revolutions. Remove the head by lifting it upwards and outwards.
- Remove the right-hand side handle and retain it for later reinstallation.
- Peel of the rubber gaiter and let it hang by the plug cable ❺.



- Gently push down on the arm ❻ to expose the head pivot nut and bolt. Noting the approximate right to left tension, use a 10mm socket/nutdriver ❼ to remove the nut and bolt.



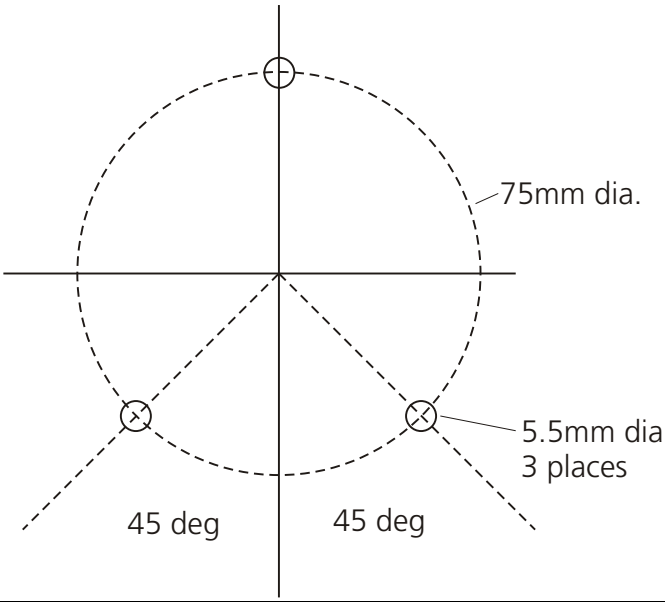
- Remove the old pivot/tilt assembly and attach the new one (using the same hardware and tool) to the same tension as previously noted.
- Remove handle from the new pivot/tilt assembly and carefully fit the rubber gaiter back into place on the stand whilst lining up both handle bolts and pulling the slack out of the head power cable (moving the arm up and down will help).

- Reinstall the handle.

- Remove the lower head mounting bolt and then, ensuring the upper bolt is tight, back it off 2 complete revolutions.
- Hang the head and tighten both head mounting bolts.
- Seat the rubber gaiter back into the groove in the head.

- Thread on the handle ❽ and screw it in.
- Plug the mains adapter into the mains supply and connect the head power cable into the head.

Mantis universal arm baseplate mounting dimensions



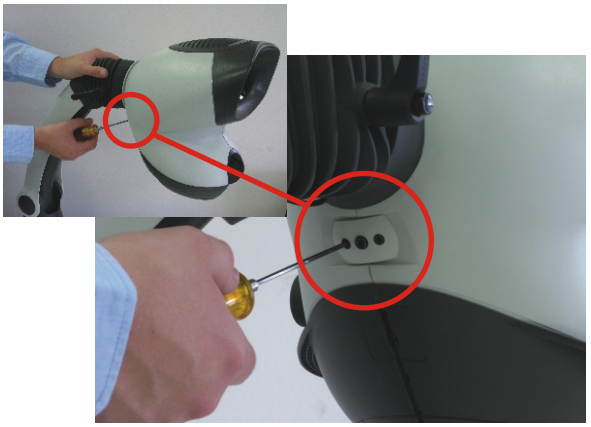
Mantis Universal Stand Baseplate (part number: 202-C-0050) mounting dimensions
Drawing not to scale. Dimensions for reference only.

Mantis Compact optical path alignment

Below is the alignment procedure for use in the field. If this procedure fails to align the unit, it is recommended that the microscope be sent back to the nearest Vision Engineering Service Centre for repair.

Tools required:
3mm, 2.5mm and 2mm hex drivers (ball end recommended).

- Loosen but do not remove the two side screws.
- Loosen the centre screw and use the hex driver as a "joystick" to re-position the left side optical path until it horizontally aligns with the right side.



- Use any available straight edge (e.g. a metal rule or strip of tape) if desired to assist in the visual alignment.

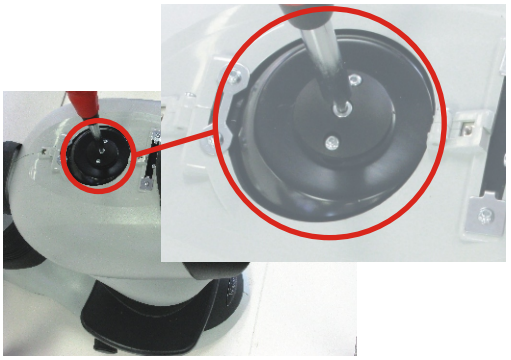
Mantis Elite optical path alignment

In most instances, it is best to have the factory align the optical paths. However, if an emergency adjustment needs to be made in the field, here is the procedure. If this procedure fails to align the unit, it is recommended that the microscope be sent back to the factory for repair.

Tools required:
3mm, 2.5mm and 2mm hex drivers (ball end recommended).

- Remove the top cover.

- Loosen but do not remove the two side screws.
- Loosen the centre screw and use the hex driver as a "joystick" to re-position the right side optical path until it horizontally aligns with the left side.

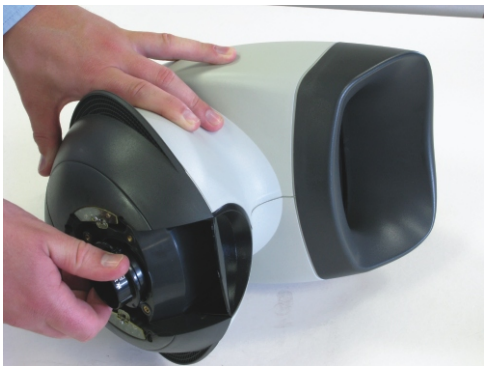


- Use any available straight edge (e.g. a metal rule or strip of tape) if desired to assist in the visual alignment.
- Replace the top cover.

Removing Mantis Compact field lens

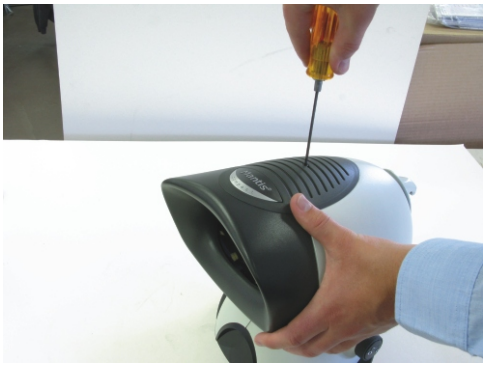
Tool required:
2.5mm hex driver (ball end recommended)

- Remove the Mantis Compact head from the stand and lay it on its side.
- Remove the objective lens.



- Stand the head upright.

- Use the 2.5 mm hex driver to remove the head cover screw.



- Remove the 2 front cover securing screws.

▶ Hold on to the backing plate whilst pivoting the front cover off.

▶ Remove the field lens.

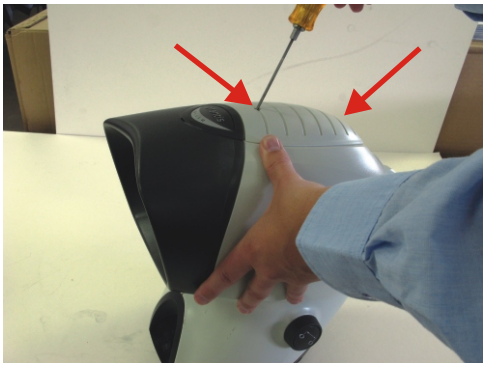
Removing Mantis Elite field lens

Tool required:
2.5mm hex driver (ball end recommended)

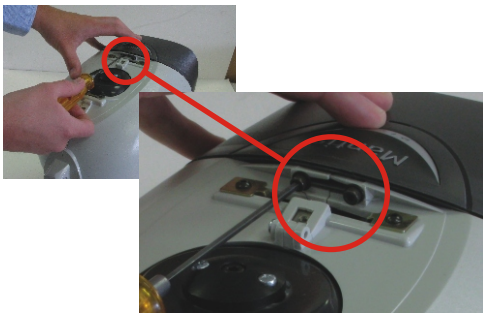
▶ Ensuring there are no objective lenses in the turret, stand the head upright.

▶ Remove the anti-reflective mask (if present).

- Using a 2.5mm hex driver, remove both top cover securing screws.



- Remove the 2 front cover securing screws using the hex driver.



- Remove the front cover.

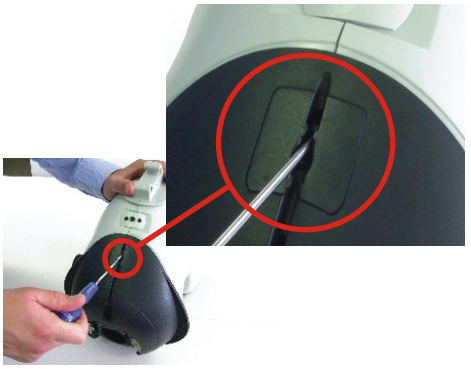
- Remove the field lens.

Replacing Mantis Compact detached mirrors

Tools required:
#1 and #2 Philips/crosshead screwdriver

- Remove the Mantis Compact head from the stand, lay it on its side and remove the objective lens.

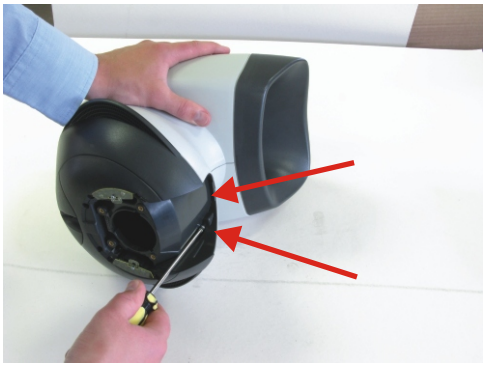
- Remove the rear cover screw.



- Remove both of the screws that secure the lower head at the rear.

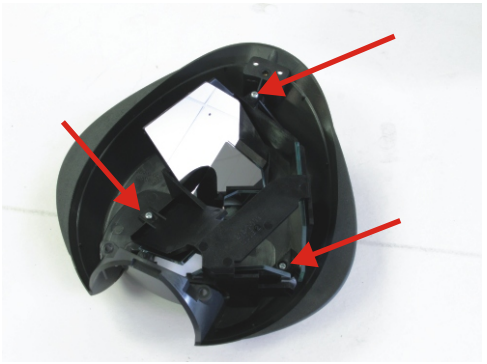
- Remove the anti-glare shield.

- Remove both of the screws that secure the lower head at the front.



- Remove lower head.

- Remove the 3 screws that secure the mirror assembly.

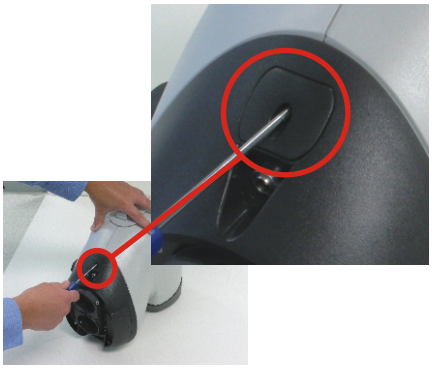


- Remove/replace the mirror assembly.
- Reverse the procedure to re-assemble.

Replacing Mantis Elite detached mirrors

Tools required:
#1 and #2 Philips/crosshead screwdriver

▶ Remove the rear cover screw.

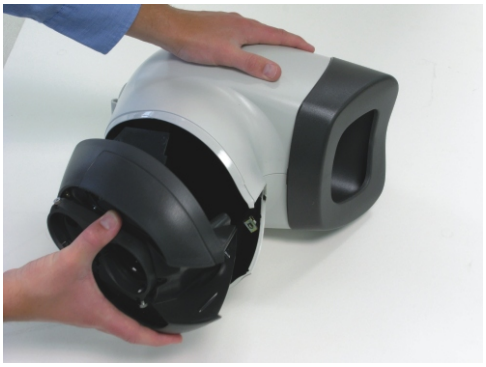


▶ Remove both of the screws that secure the lower head at the rear.

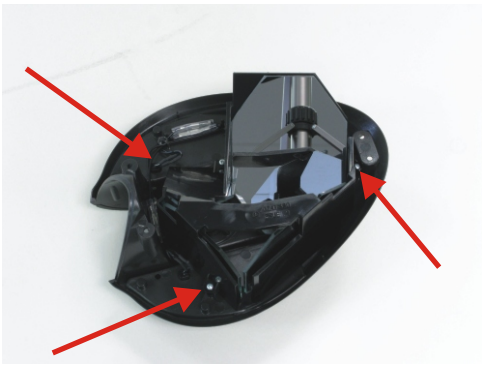
▶ Remove the anti-glare shield.

▶ Remove both of the screws that secure the lower head at the front.

- Remove lower head.



- Remove the 3 screws that secure the mirror assembly.



- Remove/replace the mirror assembly.
- Reverse the procedure to re-assemble.

Surface Cleaning and Preparation

When cleaning Mantis parts/accessories, or surfaces to re-apply adhesives for remounting mirrors, only use the following products:

- 'Hospital Quality' cotton wool
- Industrial Methylated Spirit
- Johnson Cotton Buds
- Fabric Swabs
- Anti-Static optical lens cleaning spray
- Microfibre lens cleaning cloth
- Tissues

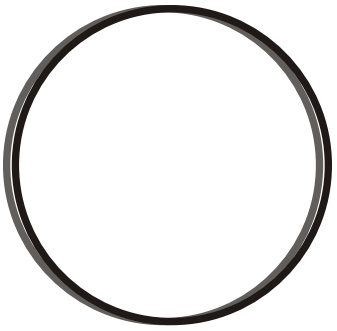
If grease or dirt has contaminated a mirror or field lens, it should be cleaned first with cotton wool and methylated spirit and then a clean tissue.

Be sure to clean the whole mirror/lens to avoid smearing/streaking.

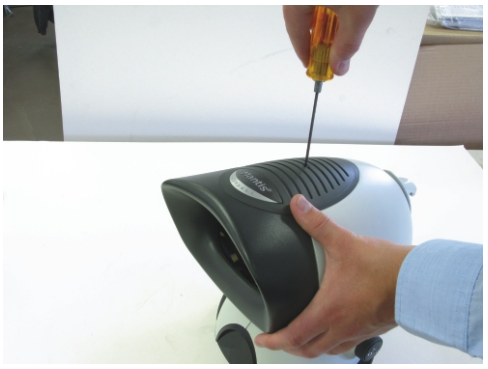
Mantis Compact viewing area adjustment

Tool required:
2.5 mm hex driver

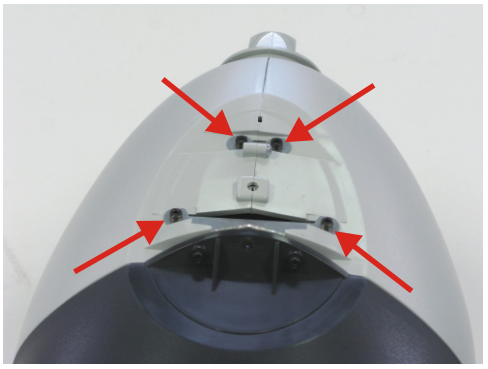
If the viewing area on the screen is shadowing and not a sharp circle (see right) adjust the top mirror as follows:



▶ Use the 2.5 mm hex driver to remove the head cover screw.

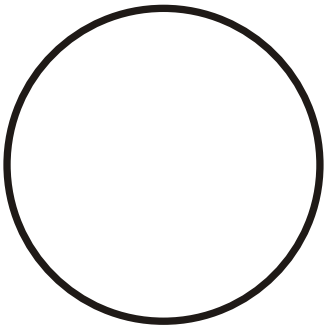


▶ Slightly loosen the 4 mirror securing screws.



▶ Use the loosened screws to adjust the mirror until the viewing area is sharp (see right).

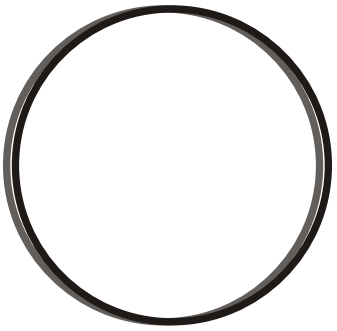
▶ Retighten the screws and replace the head's top cover.



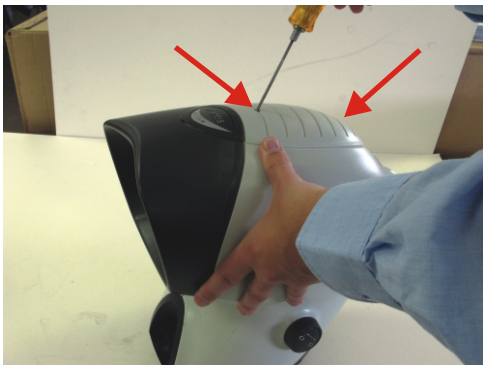
Mantis Elite viewing area adjustment

Tool required:
2.5 mm hex driver

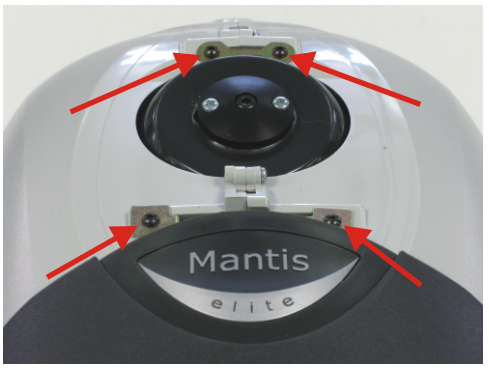
If the viewing area on the screen is shadowing and not a sharp circle (see right) adjust the top mirror as follows:



▶ Use the 2.5 mm hex driver to remove the head cover screw.

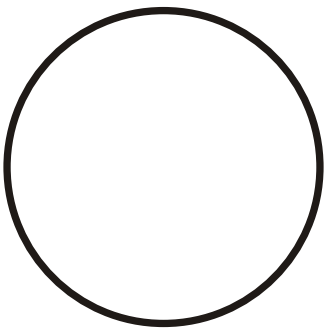


▶ Slightly loosen the 4 mirror securing screws.



▶ Use the loosened screws to adjust the mirror until the viewing area is sharp (see right).

▶ Retighten the screws and replace the head's top cover.



Spare parts

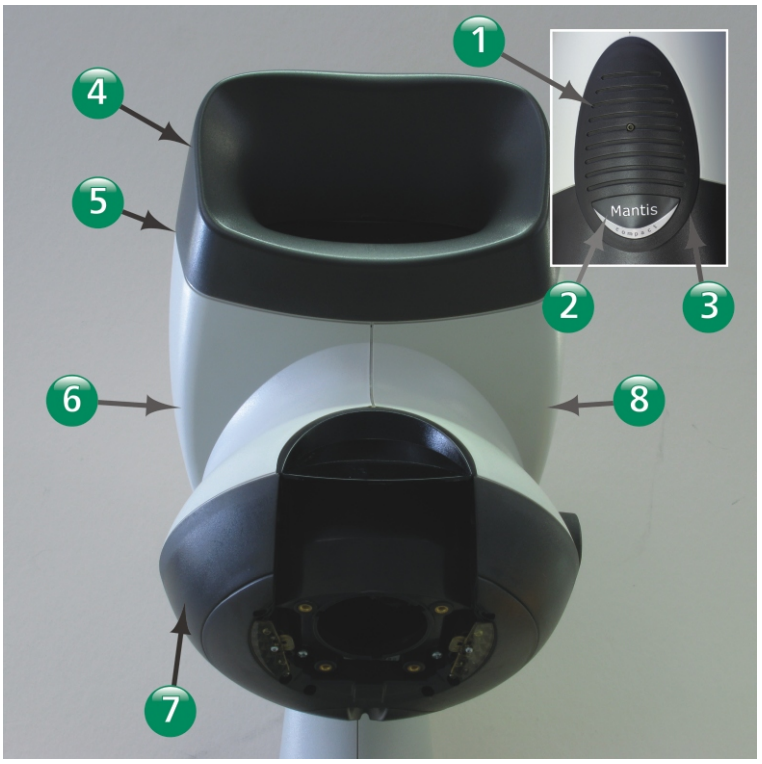
202-A0073	Mantis Arm Clamp Assembly (with G-clamp)
202-B0248	Mantis Bench Stand stage glass
202-B0316	Mantis Elite Anti-Glare Shield.
202-D0479	Elite viewing mask to shield ambient light from the viewing lens.
202-C0050	New Mantis - Bench Mount
202-C007	Compact Head Top Cover Assembly
202-B0298	Compact Rubber Gaiter
202-B0290	Compact Stand to Head Cable
202-B0299	Elite Rubber Gaiter
202-B0291	Elite Stand to Head Cable
202-A0132	2x bolts used to mount the microscope head to the stand.
MCLED-001	Replacement LED Array; Mantis Compact
MELED-001	Replacement LED Array; Mantis Elite, Left Side (2 pin connector)
MELED-001V2	Replacement LED Array; Mantis Elite, Left Side (DC Jack connector)
MELED-002	Replacement LED Array; Mantis Elite, Right Side (2 pin connector)
MELED-002V2	Replacement LED Array; Mantis Elite, Right Side (DC Jack connector)
MELED-003	Replacement LED Array; Bench Stand
202-B0445	Mantis Elite rotary turret
MPS-001	Power Supply Unit, 220V UK
MPS-002	Power Supply Unit, 115 V (USA/Japan)
MPS-003	Power Supply Unit, 220V Europe
MS-003	Replacement Dust Cover; Universal Stand system
MS-004	Replacement Dust Cover; Bench Stand system
202-A0642	Objective thumbscrews (turret)
202-A0459	Objective bolts (turret)

Note: MELED-001V2 & MELED-002V2 started with serial number: MEH-10757.

Commonly ordered parts

Mantis Compact

1. 202-C0007 - Top Cover Moulding
2. 202-A0144 - Mantis Compact Badge
3. 202-A0120 - Top Cover Moulding Seal
4. 202-D0005 - Hood
5. 202-A0119 - Hood Seal
6. 202-B0146 - Left Side Head Moulding (with adhesive beam split pads)
7. 202-D0006 - Lower Head Moulding
8. 202-B0147 - Right Side Moulding (with adhesive beam split pads)



Mantis Elite

9. 202-C0314 - Top Cover Moulding
10. 202-A0458 - Top Cover Moulding Seal
11. 202-D0315 - Hood
12. 202-A0457 - Hood Seal
13. 202-B0495 - Left Side Head Moulding (with adhesive beam split pads)
14. 202-D0313 - Lower Head Moulding
15. 202-B0496 - Right Side Moulding (with adhesive beam split pads)
16. 202-B0445 - Turret Assembly

Compact & Elite (Heads and Universal Stand)

Problem	Possible Solution
LEDs not lit.	• Verify power supply is plugged into the stand and into the power outlet (utility power). • Verify On/Off switch on stand is turned On. • Verify that the power cord in the back of the head is plugged in. • Verify that the power supply is functioning correctly. (Use a multimeter to measure the output voltage or try using a spare power supply.) • Verify that the power outlet that the power supply is plugged into is functioning properly. (Try plugging in another device to the same outlet and verify that the outlet is functioning correctly.) • If the LED arrays were recently replaced, verify that the arrays are properly installed. (Check all electrical connections to the array.) • Verify that the On/Off switch is connected inside the Universal Stand (see separate procedure to check electrical connections).
Poor image quality.	• Verify that the Interpupillary Distance adjustment is correct for the particular user. • Verify that the front viewing lens is clean. (Use a lens cleaning cloth.) • Verify that the objective lens is clean. (Use a lens cleaning cloth.) • For the Mantis Elite, verify that the objective lenses are installed flush in the rotary turret.
Head not secure on stand.	• Verify that the head mounting bolts are tight. If using the Bench stand, verify that the rear brace is properly installed and tight.
Poor image quality or out of focus	• Verify an objective lens is installed on bottom of head • For the Mantis Compact, verify that the objective lens is installed flush with bottom of head. • Verify object being viewing is at correct depth of field. Adjust by lifting head up and down. • Optical path needs to be realigned (see separate procedures)

ErgoStereo (Bench) Stand

Problem	Possible Solution
Focus knob tight or rough movement during up and down travel (Focussing)	• Send unit in for service at nearest Vision Engineering Service Centre.
Height adjust column loose	• Send unit in for service at nearest Vision Engineering Service Centre.
Top plastic sides loose	• Retighten screws that secure sides while lining up holes for head mounting bolts. If that is ineffective, it is possible the bracket that secures the sides in position is damaged. Remove sides to expose bracket and if damaged, call service for replacement part.

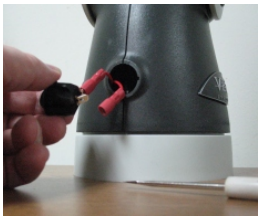
Checking the universal stand on/off switch connections

- Shown to the right, is the On/Off switch installed in the Universal Stand.

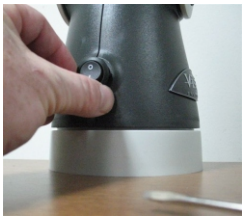
- Using a small flat blade screwdriver, gently pry the switch out.

- Once the switch is loose, pull it out using your fingers.

- Verify that both wires are properly connected (the switch shown has one wire disconnected).



- With both wires connected, reinstall the switch by gently pressing it back into place.



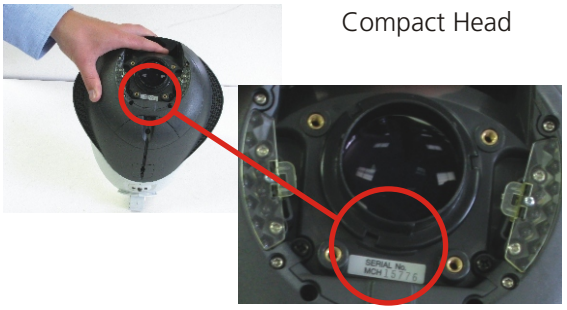
- The switch should look as shown when properly reinstalled.

Address

If after using the information provided in this manual, the Mantis product you are working with needs additional repair, please contact the appropriate address shown on the back page.

Serial number locations

Location of Mantis head serial number label.



Compact Head

Elite Head

Location of Mantis universal stand serial number label.

Location of Mantis bench stand serial number label.

Vision
ENGINEERING

WARRANTY

This product is warranted to be free from defects in material and workmanship for a period of one year from the date of invoice to the original purchaser.

If during the warranty period the product is found to be defective, it will be repaired or replaced at facilities of Vision Engineering or elsewhere, all at the option of Vision Engineering. Shipment costs for warranty repairs, to and from Vision Engineering facilities will not, normally, be borne by Vision Engineering. However, Vision Engineering reserves the right to refund the purchase price if it is unable to provide replacement, and repair is not commercially practicable or cannot be timely made. Parts not of Vision Engineering manufacture carry only the warranty of their manufacturer. Expendable components such as fuses carry no warranty.

This warranty does not cover damage in transit, damage caused by misuse, neglect, or carelessness, or damage resulting from either improper servicing or modification by other than Vision Engineering approved service personnel. Further, this warranty does not cover any routine maintenance work on the product described in the user guide or any minor maintenance work which is reasonably expected to be performed by the purchaser.

No responsibility is assumed for unsatisfactory operating performance due to environmental conditions such as humidity, dust, corrosive chemicals, deposition of oil or other foreign matter, spillage, or other conditions beyond the control of Vision Engineering.

Except as stated herein, Vision Engineering makes no other warranties, expressed or implied by law, whether for resale, fitness for a particular purpose or otherwise. Further, Vision Engineering shall not under any circumstances be liable for incidental, consequential or other damages.

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